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ON THE CAMBARI OF NORTHERN INDIANA.

BY WILL F. BUNDY.

Accompanying the collection of fishes made by Messrs. Cook and Levette, a report on which has been recently published in the Proceedings of the Academy, was a small collection of craw-fishes. They were forwarded to me for determination by Professor Jordan.

The following are the species and localities :—

Cambarus immunis, Hagen, Long Lake, Kendallville, Ind.

Not distinguishable from specimens from Central Illinois. The young have lateral thoracic spines.

C. obesus, Hagen, Long Lake, Kendallville, Ind.

A few young females were found in the collection from this locality. The most common species in the West. A female caught in the mouth of a tile ditch at Mechanicsburg, Ind., on New Year's day, 1875, had her abdominal legs loaded with eggs nearly ready to hatch.

C. virilis, Hagen, Long Lake, Kendallville, Ind.

A few individuals apparently belong to this species, but the cephalothorax is but slightly depressed, and nearly smooth above. The inner ramus of first abdominal leg of male is not transversely flattened, and the hands and fingers are less tuberculate.

C. propinquus, Girard, Elkhart River, Rome City, Ind.

C. virilis, Hagen, Elkhart River, Rome City, Ind.

C. propinquus, Gir., Deep Lake, Northern Indiana. Exact locality not given.

The largest of this species I have ever seen measured $7\frac{1}{2}$ decimeters from tip of rostrum to that of telson. Two females present unusual variations. In one a second annulus appears between the third thoracic legs, somewhat similar in shape, but smaller in size than the normal organ. Another has hooks developed on the third thoracic legs, precisely as in males of the first form. There is also in these craw-fishes a tendency manifested toward multiplication of the lateral thoracic spines, there being in some individuals two, and in others three of these on each side.

A considerable number of this species, from an unknown locality, differ in having wider, more gaping hands, thicker at the base, as in *C. placidus*.

C. sloanii, Bundy, Bulletin No. 1, Mus. Ill. Nat. Hist., 1876, page 24.

Rostrum wide, excavated, margins nearly parallel, straight, or nearly so, acumen triangular, acute, toothed at base; cephalic carinae short, near margin in front; antennae shorter than body; laminae longer than rostrum, moderately wide, external margin curved, swollen, apical tooth long, acute; epistoma wider than long, excavated narrower in front, emarginate; maxillipedes hairy on inner faces, naked below; cephalothorax subovoid, dorsum depressed, carapace finely granulated; lateral spines acute; anterior border of cephalothorax distinctly angulated; areola wide, posterior spatium wider than anterior; chelae short, conical, wide, swollen toward base, nearly smooth below, finely granulated above, inner margin provided with two rows of inconspicuous teeth; outer finger wide at base, nearly straight, furrowed above on outer and inner margins, punctate above and below, inner margin with a row of small tubercles; inner finger curved, inner and outer margins tuberculate or serrate, more punctate above than below, incurved tips of both fingers brown, horny; third joint of third pair of thoracic legs hooked; first abdominal legs of male bifid, parts of nearly equal length, flattened, outer one nearly straight, apex directed outward; inner part slightly recurved, separating from outer part, and ending with acute points turned inward; tubercles at inner basal angle small, legs when folded under thorax reach to coxae of second thoracic legs.

In the second form male, the chelae are smaller and shorter, hooks on third legs smaller, first abdominal legs articulated between node and base, tips swollen, not brown horny.

The annulus of female has the anterior border scarcely separated from fourth venter, posterior border elevated, posterior angle prominent, bituberculate, the tubercles encroaching on fossa, lateral angles acute.

This species is very similar to *C. obscurus*, but on comparing it with types of this species I find the following points of difference: The rostrum is somewhat wider and more punctate above, the areola is wider, the fingers less gaping at base, the branches of first abdominal legs are round and slender in *C. obscurus*, and straight, while in *C. sloanii* they are flattened, and bent outward

and backward. The annulus of female is also decidedly different in the two species. In *C. obscurus* it is divided by a cruciform furrow into four tubercles, of which the anterior pair are largest.

Length of largest male I have seen, $3\frac{1}{2}$ inches. This species inhabits streams in Southern Indiana and Kentucky. Dr. Sloan, who has studied its habits in its native streams, says of it: "I think his habit of burrowing is peculiar. He commences on the bank of the stream, burrows below the bed, and has an opening two or more feet out in the stream, where he sits watching for anything that may turn up, with a safe retreat. He can only be caught in that position by thrusting the net deep in the mud, so as to cut off his retreat."

Cambarus spinosus, Bundy, sp. nov.

Rostrum quadrangular, long, excavated, smooth above, toothed at apex; margins parallel, curved; acumen long, slender; cephalothorax depressed, punctate above, granulated on sides; lateral spines long, acute; cephalic carinæ parallel, black acute teeth in front; areola present; transverse suture not sinuous; antennæ slender, very long, reaching beyond tip of telson; laminæ as long as rostrum, narrow, tapering toward long, sharp, outward-directed apical teeth; long acute tooth at base; external margin incurved; epistoma wide, emarginate in front; maxillipedes hairy within, naked below; chelæ large, thick at base, smooth below, punctate above, inner margin finely serrate; fingers slender, curved, slightly gaping, costate above, smooth below, tuberculate and hairy on contiguous margins, of equal length, banded with black on distal half; outer margin of outer finger with a black stripe reaching on hand to carpus; two or three black spots on hand at base of movable finger; carpus with a sharp curved spine on inner margin, one on superior and two on inferior front margin; two rows of teeth on lower border of brachium, outer row with only two teeth; third joints of third pair of legs of male hooked; first pair of abdominal legs of male strongly bifid, tips of equal length, very slender, straight, separating at node; anterior margin with a tooth or projecting angle about midway from base to extremities; apical forming a very obtuse angle with basal half.

The second form male has hooks on third legs smaller, first abdominal legs longer, external part longer than internal, and slightly recurved, both tips much thicker, no tooth on anterior

margin, articulated below node and narrower at base. The female has smaller, narrower hands, straighter fingers, not gaping at base. The annulus is directed obliquely backward, transversely elliptical, a large tubercle on posterior angle and two smaller ones in front separated by a furrow continuous with nearly straight, well-defined fossa.

The longest male I have ever seen measured $3\frac{3}{4}$ inches from rostrum to tip of telson. The length of areola is contained twice in the distance from transverse suture to base of apical teeth of rostrum, thus giving the animal a peculiarly short-waisted appearance.

I have seen nineteen specimens of *C. spinosus*, of which seven were second form males and eleven females.

Habitat.—Etowah, Oostanaula and Coosa Rivers, in the vicinity of Rome, Georgia, where it is extremely abundant, in company with *C. extraneus*. From the collection of Prof. D. S. Jordan.